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江苏句容中生代晚期中华鳞齿鱼属(Sinolepidotus) 一新种,兼论该属的系统位置[1)]

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摘要　记述了在江苏句容发现的中华鳞齿鱼属(*Sinolepidotus*) 一新种 ——长背鳍中华鳞齿鱼(*Sinolepidotus longidorsalis* sp. nov.) 。新种的一般形态特征如身体高纺锤形,背鳍长,臀鳍离尾鳍近,头骨外部骨片的形状及排列格局,口裂小,下颌骨有较高的冠状突,口缘牙齿高而尖,体侧中部和背区的一些鳞片高显著大于宽等,与浙江早白垩世的浙江中华鳞齿鱼(*Sinolepidotus chekiangensis*) 很相似。但新种具有背鳍较长,背鳍鳍条数目较多,吻突尖,及鳞片后缘梳状齿不发育等特征区别于浙江中华鳞齿鱼。此外,评论了中华鳞齿鱼属的系统位置,认为它的形态特征与 *Paralepidotus* 很相似,对它原列入半椎鱼科提出疑问。根据长背鳍中华鳞齿鱼的性质并参考有关地质古生物资料,将含鱼层杨冲组的时代定为早白垩世。

关键词　江苏句容,早白垩世,杨冲组,半椎鱼目
中图法分类号　Q915. 862

本文记述的半椎鱼类化石是由江苏省区测队第三分队于 1979 年采自江苏句容杨冲组,化石产于灰黄色中薄层钙质粉砂岩灰粉砂质泥岩中。同年冬寄交中国科学院古脊椎动物与古人类研究所鉴定。当时,经笔者初步鉴定为中华鳞齿鱼属(*Sinolepidotus*) ,认为其地质时代可能为早白垩世。1980 年初夏,笔者在该区测队第三分队协助下观察了产鱼化石地层杨冲剖面并补充采集到若干化石。其后,周忠和也在该队闵庆魁协助下对该地区作过调查。现对此批鱼化石进行了系统研究,确定为中华鳞齿鱼属一新种,并认为中华鳞齿鱼属与欧洲(意大利、奥地利) 晚三叠世的副鳞齿鱼属(*Paralepidotus*) 很相似。过去在江苏省境内中生代中、晚期的鱼化石未见任何研究报道。这个新发现不仅填补了地区和地层上的空白,为该地区中生代地层划分对比提供了依据,而且也将有助于了解我国东南沿海地区中生代后期鱼群与世界其他地区鱼群的关系。

1　标本记述

新鳍次纲 **Neopterygii sensu Patterson 1973**
半椎鱼目 **Semionotiformes Arambourg et Bertin 1958**
科未定 **Family incertae sedis**
中华鳞齿鱼属 Sinolepidotus **Wei et al. 1976**

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特征(订正) 身体小,高纺锤形;额骨长而窄;顶骨大,在中线相接;在下眶骨前有一列泪骨和一长三角形的眶前骨;有两块眶上骨;有次眶骨;颌悬挂略向前倾斜,颌关节约于眼眶中部之下;口裂小,上颌骨强壮,前部变低窄;前上颌骨具有较短的鼻突和牙齿;下颌骨短而粗壮,具有较高的冠状突,口缘牙齿高而尖;鳃盖骨大,略呈长方形;下鳃盖骨小,具有短的前背突;前鳃盖骨狭窄,近弓形;间鳃盖骨位于下鳃盖骨的前下方;有两块后匙骨;背鳍颇长,其起点在背缘隆起最高处,鳍条粗壮、排列稀,具有基部棘鳞;腹鳍小,腹位,鳍条数目少,前缘具有1根粗壮的不分叉鳍条和基部棘鳞;臀鳍基短,很靠近尾鳍,鳍条数目少而密集,前缘具有1根粗壮的不分叉鳍条;尾半歪形,中轴叶短而窄;尾鳍浅分叉;鳞片菱形,但躯干体侧中部和背区的鳞片高显著大于宽;所有鳞片均被有较薄的硬鳞质层,无明显的纹饰,后缘梳状齿很发达或不发育;有背嵴鳞,但不显著。

长背鳍中华鳞齿鱼(新种) Sinolepidotus longidorsalis **sp. nov.**

(图1～5)

正型标本 一近乎完整的鱼。中国科学院古脊椎动物与古人类研究所标本登记号IVPP V 12176.1。

参考标本 V 12176.2较完整(偶鳍和臀鳍缺失);V 12176.3较完整(偶鳍和臀鳍缺失);V 12176.4和V 12176.5均为躯干连带部分头骨;V 12176.6为一块围岩上埋藏着一群鱼化石。

种的特征 背鳍长,鳍条数目较多(24～29);吻突尖;鳞片后缘梳状齿不发育;有扩大的臀鳞;有腹嵴鳞。

产地与层位 江苏南部句容县杨冲,杨冲组(早白垩世)。

释名 种名*longidorsalis*由拉丁文longi(长)和dorsalis(背)组成。

描述 体小,正型标本全长约达115mm,体高纺锤形。躯干背缘显著隆起呈弧形,在背鳍起点处形成钝角(图1)。体长约为体高的2.5倍,头长的3.3倍。体高约为头长的1.3倍。尾柄短。

头中等大小,侧视略呈三角形。颅顶显著向前倾斜。吻突尖。头骨(图2)大部分骨片只保存有印模。从残存的骨片来看,均较薄并被有较薄的硬鳞质层。顶骨大,略呈长方形。额骨长而窄。鼻骨较宽大(V 12176.5),与*Dapedium* sp.(Patterson,1975,Fig.134)的相似。膜质翼耳骨较狭窄,呈长条形。上颞骨和后颞骨均保存不佳。眼眶较小,围眶骨环保存不完全,膜质蝶耳骨构成眼眶后上缘;眶上骨二块,前一块较小,后一块较大;正型标本的眶下骨系统仅保存有几块骨片的印模,但在V 12176.5号标本的围眶骨环之前有一列(约4块)略呈长方形的泪骨和一块略呈长三角形的眶前骨,与*Semionotus*和*Lepidotes*(Su,1983)的相似。颊部次眶骨保存不佳,数目不明。舌颌骨在V 12176.4显露,近乎直立,强壮而较扁宽,中部显著收缩,仅有单个较宽大的关节头。口裂小,颌关节在眼窝中前部之下。上颌在V 12176.5保存较好(图3):前上颌骨具有较短的鼻突,附于鼻骨,其口缘残存一些齿根,在正型标本上牙齿高而尖;上颌骨强壮(图3),前部急剧减低,变窄尖,口缘近乎平直,与*Lepidotus*(Woodward,1916～1919,Figs.12～13B)的相似,未见牙齿。下颌骨颇为强壮(图2、3),主要由齿骨和隅-关节骨组成,具有较高的冠状突,但比*Paralepidotus*(Tintori,1996,Fig.2A)的为低,口缘生有高而尖的牙齿。鳃盖系统骨片(图2)的形状及排

列格局颇似 *Paralepidotus*。鳃盖骨高而较窄,略呈长方形;下鳃盖骨仅保存有印模,颇小于鳃盖骨;前鳃盖骨狭窄,下枝略变宽,呈弧形;间鳃盖骨位于下鳃盖骨的前下方,略呈长三角形;鳃条骨残存一些印模,据判断,其数目较少。

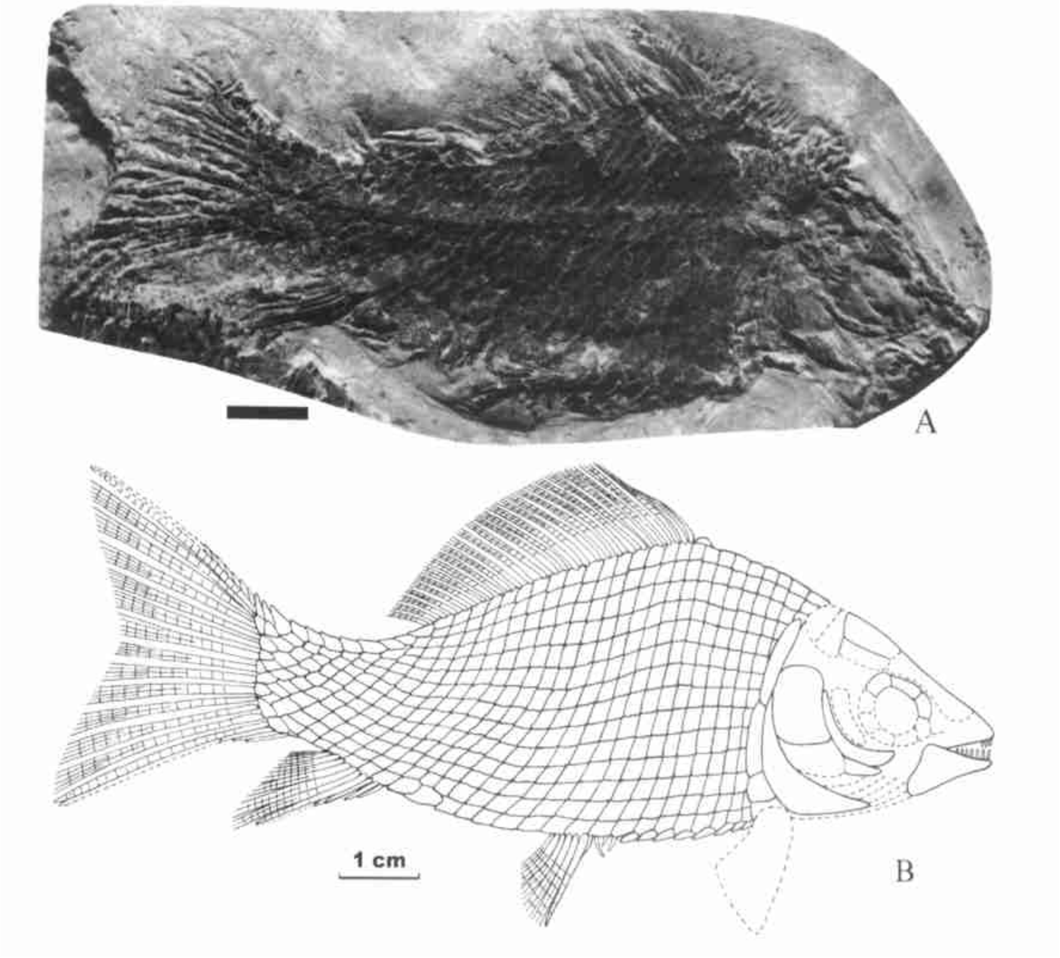

图 1　长背鳍中华鳞齿鱼(新种),比例尺 = 1cm

Fig. 1　*Sinolepidotus longidorsalis* sp. nov.,scale bar = 1cm

A. 正型标本(Holotype,V 12176.1),一近乎完整的鱼(a nearly complete fish),右侧视(right lateral view);

B. 复原图(restoration),右侧视(right lateral view),主要根据正型标本和 V 12176.2 (mainly based on the holotype and V 12176.2)

肩带部保存有匙骨、上匙骨及后匙骨(图 2)。匙骨很发达,下枝较宽并颇向前弯伸,上枝较窄高,向上逐渐变窄。上匙骨窄而高。后匙骨两块,上一块较高大,略呈长三角形;下一块较小,略呈方形。上述肩带部骨片均被有较薄的硬鳞质层,未见纹饰。胸鳍仅残存鳍基部一些骨片印模。胸鳍位低。

背鳍基很长,与 *Paralepidotus*、*Macrepistius*(Schaeffer,1960)、*Ophiopsis* 及 Macrosemiidae (Bartram,1975,1977)中的相似,占躯干长的一半以上,其起点在背缘隆起最高处,终点几乎对着两个扩大的臀鳞(图1B)。鳍条数目在正型标本上保存有 II + 22根,在V 12176.2

标本上有 II + 27 根。所有鳍条均较粗而排列间距较大,都被有较薄而光滑的硬鳞质层。紧靠背鳍前缘基部生有较粗壮的基部棘鳞。腹鳍很小(图 1B),离胸鳍比离臀鳍略近,约有 I + 5 根粗壮而紧密排列的鳍条,不分叉鳍条粗壮而似棘状,均被有较薄而光滑的硬鳞质层。紧靠腹鳍前缘基部约有 4 根基部棘鳞,从前向后依次增长。臀鳍很靠近尾鳍(图 1B),约有 I + 6 根粗壮而紧密排列的鳍条,前面最长的鳍条伸到尾鳍之下,不分叉鳍条更粗壮,也似棘状。所有鳍条均被有与腹鳍上相似的硬鳞质层。臀鳍前缘基部约有 3 根粗壮的基部棘鳞。尾半歪形(图 1),中轴叶短而窄。尾鳍末梢保存不好,根据其鳍条向后伸展的情况来判断,很可能浅分叉,具有 14 根粗壮而排列较稀的主鳍条,尾下叶 8 根,尾上叶 6 根。上、下叶边缘各有一根粗壮的鳍条从近基部开始分节,远端不分叉,其余鳍条均从近基部开始分节分叉。所有鳍条均被有薄而光滑的硬鳞质层。尾鳍无轴上鳍条。尾上、下叶基部均具有几根较粗壮的基部棘鳞。

鳞片较大而薄,躯干前中部和背区的一些鳞片高显著大于宽,呈长方形(图 1B, 5),与 *Sinolepidotus chekiangensis* (Wei et al., 1976)、*Histionotus* (Bartram, 1977) 的相似。躯干后部和尾柄侧面的鳞片呈菱形。靠近腹缘的鳞片高与宽几乎相等。躯干中前部的鳞片彼此覆压较多特别是靠近头后者。杵臼式关节微弱,仅见于躯干前部的体侧鳞。所有鳞片均被有较薄的硬鳞质层,表面较光滑。鳞片后缘梳状齿不发育。在胸鳍和腹鳍之间的腹缘具有腹嵴鳞,与半椎鱼类

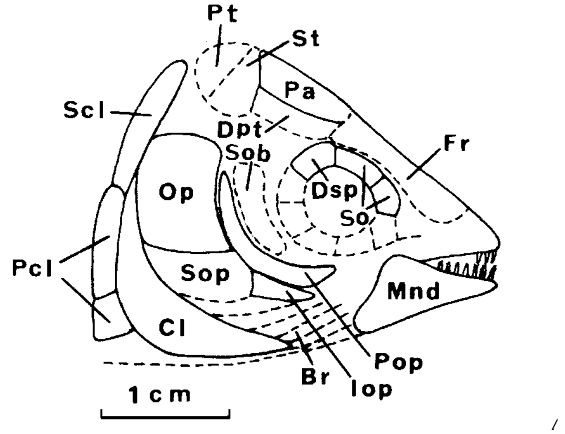

图 2 长背鳍中华鳞齿鱼(新种)的头骨和肩带(部分复原),主要根据正型标本和 V 12176.2

Fig. 2 Skull and pectoral girdle of *Sinolepidotus longidorsalis* sp. nov. (partly restored), mainly based on the holotype and V 12176.2

简字说明见图 3 (for abbreviations see Fig. 3)

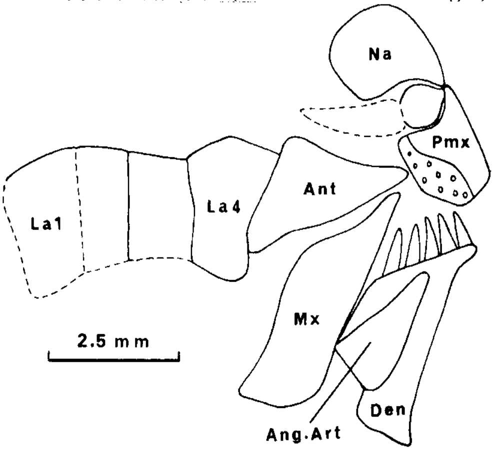

图 3 长背鳍中华鳞齿鱼(新种),围眶骨环前的一列泪骨、吻部及上、下颌复原,根据 V 12176.5

Fig. 3 *Sinolepidotus longidorsalis* sp. nov., a series of lacrimals anterior to the circumorbital ring, snout and jaws (enlarged), based on the specimen V 12176.5

Ang. Art, angulo-articlar 隅 - 关节骨; Ant, antorbital 眶前骨; Br, branchiostegal 鳃条骨; Cl, cleithrum 匙骨; Den, dentary 齿骨; Dpt, dermopterotic 膜质翼耳骨; Dsp, dermosphenotic 膜质蝶耳骨; Fr, frontal 额骨; Iop, interopercular 间鳃盖骨; La 1 - 4, lacrimal 1 - 4 泪骨 1 - 4; Mnd, mandibula 下颌骨; Mx, maxilla 上颌骨; Na, nasal 鼻骨; Op, opercular 鳃盖骨; Pa, parietal 顶骨; Pcl, postcleithrum 后匙骨; Pmx, premaxilla 前上颌骨; Pop, preopercular 前鳃盖骨; Pt, posttemporal 后颞骨; Scl, supracleithrum 上匙骨; So, supraorbital 眶上骨; Sob, suborbital 次眶骨; Sop, subopercular 下鳃盖骨; St, supratemporal 上颞骨

图 4　长背鳍中华鳞齿鱼(新种),一较完整标本(V 12176.2)**,左侧视,示头部骨片和保存较完全的背鳍,比例尺** = 1cm

Fig. 4　*Sinolepidotus longidorsalis* sp. nov. ,a nearly complete specimen(V 12176.2) ,left lateral view ,showing skull-bones and nearly complete dorsal fin ,scale bar = 1cm

图 5　长背鳍中华鳞齿鱼(新种),V 12176.4**,头骨及躯干,示鳃盖系统骨片和鳞片的形状,右侧视,比例尺** = 1cm

Fig. 5　*Sinolepidotus longidorsalis* sp. nov. ,V 12176.4 ,skull with trunk ,showing shape of scales and bones of opercular apparatus ,right lateral view ,scale bar = 1cm

的 *Hemicalypterus* (Schaeffer ,1967 ,Fig. 12) **相似。尾柄上有些中背鳞扩大而成形状不规则的嵴鳞。紧靠臀鳍之前有两个扩大的臀鳞(图** 1B) **。侧线鳞约有** 31～32 **个。侧线一条,从头后沿体侧中央一列鳞片,延伸到尾中轴叶的基部。**

正型标本(V 12176. 1) 测量 Measurements of the holotype(mm)

全长(Total length)	115(ca.)
体长(Tip of snout to beginning of caudal inversion)	90
体高(Maximum depth of body)	36
头长(Length of head with opercular apparatus)	27
头高(Depth of head)	25
尾柄长(Length of caudal peduncle)	12
尾柄高(Depth of caudal peduncle)	11.5
背鳍起点至吻端(Origin of dorsal fin to tip of snout)	37
背鳍起点至尾基(Origin of dorsal fin to beginning of caudal inversion)	54
背鳍基长(Length of base of dorsal fin)	35
背缘长(Length of dorsal edge of body)	63
腹鳍起点至胸鳍起点(Origin of pelvic fin to that of pectoral fin)	27
腹鳍起点至臀鳍起点(Origin of pelvic fin to that of anal fin)	28

2 比较

以上所描述标本的一般形态特征如身体高纺锤形、背鳍基长、臀鳍很靠近尾鳍、头骨顶部和鳃盖系统骨片的排列格局、口裂小、下颌骨具有较高的冠状突、口缘牙齿高而尖以及躯干前中部的体侧鳞和背区的一些鳞片高显著大于宽等,与浙江早白垩世的浙江中华鳞齿鱼(*S. chekiangensis*)很相似,但具有以下重要特征显然不同于后者:背鳍基较长,鳍条数目较多(24～29 根,后者(经笔者观察)约 18～20 根);吻较突尖;体侧鳞后缘梳状齿不发育,后者具有众多的梳状齿;有腹嵴鳞和扩大的臀鳞。因此,它应代表该属一新种,以其主要特征——背鳍长为种名,命名为长背鳍中华鳞齿鱼(*Sinolepidotus longidorsalis* sp. nov.)。

3 讨论

3.1 关于中华鳞齿鱼属的系统位置

中华鳞齿鱼属是由魏丰等(1976)根据产于浙江武义早白垩世馆头组的若干不完整的标本所建。原研究者当时只将武义标本与鳞齿鱼属(*Lepidotus*)、亚洲鳞齿鱼属(*Asialepidotus*)、新鳞齿鱼属(*Neolepidotes*)作了比较,认为武义标本与后三个属很相似又都不相同而建立了与鳞齿鱼有关系的属名,并将其归属于半椎鱼科(Semionotidae)。笔者对原研究者所依据的标本作了观察,认为中华鳞齿鱼在形态特征上与后三个属有很大的区别,而与欧洲(意大利、奥地利)晚三叠世的 *Paralepidotus* 很相似,例如,身体高纺锤形,背缘显著隆起成弧形;背鳍很长,占躯干长的一半以上,其起点在背缘隆起最高处;半歪形尾,中轴叶颇短;有不显著的背嵴鳞;一对大而长方形的顶骨在中线相接;额骨长而窄;一对板状的上颞骨(额外肩胛骨)在中线相接;鳃盖骨高而窄;前鳃盖骨窄而成弧形;口裂小,下颌骨短,颌关节在眼眶中前部之下;有次眶骨;前背区的鳞片高显著大于宽;饰缘棘鳞微弱。然而,中华鳞齿鱼与 *Paralepidotus* 也有很明显的区别,例如后者的眶上骨较多(5 块)、下颌骨冠状突很发达、下鳃盖骨具有很长的前背突、鳃条骨数目较多(9 根)、尾鳍鳍条数目较多(主

鳍条 20 根,在中华鳞齿鱼中仅 14 根)、牙齿研磨形。

上述特征表明,中华鳞齿鱼应是一独立属。至于它应当归属于哪一科是值得商榷的。随着古鱼类学研究的进展,"全骨鱼类"的分类已发生了巨大的变化,例如,McCune (1986) 对欧洲三叠纪和侏罗纪的 *Semionotus* 作了重新研究,Olsen 和 McCune (1991) 对北美纽瓦克超群上部早侏罗世的半椎鱼属种群的形态学作了深入的研究后,将 Woodward (1895)、Danil'chenko (1964)、Lehman (1966) 关于 Semionotidae 的定义作了很大的修正。按照他们的意见,该科仅包括 *Semionotus* 和 *Lepidotes* 两个属,定义特征为:1) 有一列完全的背嵴鳞;2) 上耳骨(epiotic)具有一个大而向后的突起。*Paralepidotus* 由 Stolley (1920) 建立后,一直被归属于半椎鱼科。Olsen 和 McCune (1991) 将它从此科排除出去。Tintori (1996) 重新研究了 *Paralepidotus*,认为它具有半椎鱼科的两个定义特征,又将其重新归入该科。同时,Tintori 指出,Olsen 和 McCune 的第一个定义特征有些含糊,其理由是鳞齿鱼属(*Lepidotes*)中有少数种并无明显的背嵴鳞或者只有很不显著的背嵴鳞,而另一些原列入半椎鱼类的属如 *Tetragonolepis* 和 *Sargodon* 则具有很发达的背嵴鳞。中华鳞齿鱼具有不显著的背嵴鳞,大致上符合半椎鱼科的第一个定义特征,但上耳骨是否有一大而向后的突起尚不清楚,故将其列入 Semionotidae 还是有疑问的,所以,暂不确定科为宜。

3.2　关于含鱼化石层杨冲组的时代

杨冲组是由江苏省区测队第三分队于 1979 年调查句容杨冲一带中生代地层时从原属于黄马青群范塘组(原定为晚三叠世)中划分出来建立的,被改订为晚侏罗世。据该区测队第三分队地质资料,从杨冲组中采集到三大门类化石,包括瓣鳃类、叶肢介和鱼。瓣鳃类化石经马其鸿鉴定为长中村蚌(*Nakamuranaia elongata*)、近圆中村蚌相似种(*Nakamuranaia* cf. *N. subrotunda*)、青山中村蚌相似种(*Nakamuranaia* cf. *N. chingshanensis*),将其时代定为晚侏罗世至早白垩世。叶肢介化石经陈丕基鉴定为直线叶肢介未定种(*Orthestheria* sp.),其时代被定为早白垩世。鱼化石当时经本文作者初步鉴定为中华鳞齿鱼属(*Sino-lepidotus*),认为其时代可能属于早白垩世。现根据此批鱼化石的系统研究,确认它们是属于中华鳞齿鱼属一新种。它在形态特征上虽与浙江馆头组所产的浙江中华鳞齿鱼有显著的区别,但在进化水平上看不出有大的差异。关于馆头组的时代,目前一般都认为属早白垩世(张弥曼、周家健,1977)。因此,笔者认为句容含鱼层杨冲组的时代应属早白垩世。

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A NEW SPECIES OF SINOLEPIDOTUS FROM LATE MESOZOIC OF SOUTHERN JIANGSU, WITH COMMENTS ON THE GENUS SINOLEPIDOTUS

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Key words　Jurong, Southern Jiangsu, Early Cretaceous, Semionotiformes

Summary

The fossil holostean described here was collected from Jurong County, Southern Jiangsu Province, and referred to a new species, *Sinolepidotus longidorsalis*, of the genus *Sinolepidotus*. This new species resembles *Sinolepidotus chekiangensis* in its body form, elongated dorsal fin, small mouth, deep coronoid process of the mandible, and deep scales in the middle portion of the flank and dorsal region of the body. However, it is characterized by longer dorsal fin, large number of rays of dorsal fin, acute snout, lack of pectinations of scales, and thus is distinguished from *Sinolepidotus chekiangensis*. The genus *Sinolepidotus* is reviewed and its systematic position within the Order Semionotiformes is uncertain. According to the nature of *Sinolepidotus* and invertebrate fossils, the age of the fish-bearing beds is considered as Early Cretaceous.

Infraclass Neopterygii sensu Patterson 1973

Order Semionotiformes Arambourg et Bertin 1958

Family incertae sedis

Genus Sinolepidotus **Wei et al. 1976**

Type species *Sinolepidotus chekiangensis* Wei et al. 1976.

Generic diagnosis (emended) Body small and deep, fusiform; frontals long and narrow; parietals large and in contact in the midline; presence of a series of lacrimals anterior to the circumorbital ring; antorbital comparatively large and elongated-triangular; supraorbitals two in number; suborbitals present; mouth gape small, jaw articulation lying below the middle of the orbit; maxilla and dentary short and relatively deep, the former tapering in front, the latter with deep coronoid process; premaxilla small, with short nasal process; marginal teeth deep and pointed; operculum large and roughly rectangular; suboperculum small, with short antero-dorsal process; preoperculum narrow and arched; interoperculum antero-ventral to suboperculum; two postcleithra present; pectoral fins lowly situated; dorsal fin elongated, exceeding half the length of the trunk, its fin-rays stout and well-spaced, with basal fulcra; pelvic fin small and abdominal, with an unbranched, sturdy and spine-shaped leading ray and basal fulcra; anal fin short-based and situated in the back, with an unbranched, sturdy and spine-shaped leading ray and basal fulcra; tail hemiheterocercal, its axial lobe short and narrow; caudal fin slightly forked, with about I + 12 + I strong fin-rays, its upper and lower lobes with basal and fringing fulra; scales rhombic, but those of the middle portion of the flank and dorsal region of the body much deeper than broad; the peg-and-sock articulations weak; all the scales covered with a thin layer of ganoine; the pectinations of flank-scales either well developed or not developed, dorsal ridge scales inconspicuous.

Sinolepidotus longidorsalis **sp. nov.**

(Figs. 1～5)

Holotype A nearly complete fish, Cat. No. IVPP V 12176.1.

Referred specimens V12176.2, a nearly complete fish (pelvic, anal and caudal fins missing); V12176.3, skull with trunk; V 12176.4 and V 12176.5, two incomplete skulls with trunks; V 12176.6, a group of fossil fishes embedded in a matrix rock.

Diagnosis Dorsal fin very long, with large number of fin-rays (24～29); snout acute; pectination of flank-scales not developed; enlarged anal scales present; ventral ridge scales present.

Locality and Horizon Yangchòng village, Jurong County, Southern Jiangsu; Yangchòng Formation, Early Cretaceous.

Description The body small and deeply fusiform, dorsal margin of the trunk is rising at the origin of the dorsal fin. Type specimen has a length of about 115 mm. The maximum depth of the body is about 1/2.5 of the body length. The length of the head is about 1/3.3 of the body length, and about 1/1.3 of the maximum depth of the body. The length of the caudal peduncle is somewhat longer than its depth.

The skull (Fig. 1) is roughly triangular from its side view. The skull roof is inclined at an

and comparatively narrow, and slightly contracted above the orbits. The parietals are large and roughly rectangular in outline. In the holotype the supratemporal is badly preserved, but in the specimen V 12176.2 the left supratemporal can be seen and appear to be comparatively large. The orbit is small. The circumorbital ring is incompletely preserved, supraorbitals are two in number, infraorbitals are badly preserved, but in V 12176.5 there are a series of lacrimals and a triangular antorbital anterior to the circumorbital ring (Fig. 3). Suspensorium is slightly inclined forward. The mouth is small, maxilla is short and tapers in front, no teeth are observed on its oral margin. The premaxilla is small, bearing pointed teeth. The mandible is strong, consiting of dentary and angulo-articular. The dentary bears deep and pointed teeth. The opercular (Fig. 2) is rather large and much deeper than broad. The subopercular is considerably smaller than opercular. The preopercular is very narrow and arched, its horizontal limb is somewhat expanded. The interopercular is elongated, attenuated anteriorly. The branchiostegal rays are few in number. The cleithrum is well developed, its horizontal part is rather expanded. There are two postcleithral scales behind the cleithrum, of which the upper one is very deep and roughly elongated-triangular, the lower is about

a thin layer of ganoine. The pectoral fin is indicated by a few broken fin-rays. The elongated dorsal fin (Fig. 1B) arises at the angulation of the back, extending to the dorsal edge above the two enlarged anal scales, it consists of about two unbranched and 24～27 branched and well spaced fin-rays, with about two basal fuclra. The pelvic fin is small, arising midway between the pectoral and

basal fulcra. The anal fin is posteriorly placed, including one spine-shaped unbranched and six branched fin-rays, with about three basal fulcra. The tail is hemiheterocercal, with very short and narrow axial lobe. The caudal fin is slightly forked, with I + 12 + I strong and well spaced fin-rays, which are not segmented for short distance proximally, but towards the tips they are closely segmented. The dorsal and ventral edges of the caudal fin bear delicate fringing and strong basal fulcra.

The scales are rhombic, but those of the middle portion of the flank and dorsal region of the trunk are much deeper than broad (Fig. 5) the depth of the scales gradually decrease ventrally and

the anterior flank-scales. All the scales are covered with a thin and smooth layer of ganoine. The

oblique row of the scales counted from the origin of the pelvic fin to that of the dorsal fin is fourteen or fifteen. There are two enlarged anal scales in front of the anal fin. The ventral ridge scales are present between the pelvic and pectoral fins. Some of the median dorsal scales of the caudal peduncle are markedly enlarged and irregular in shape. A single lateral line pass through the median row of scales on the flank, extending to the base of the axial lobe of the tail.

Remarks *Sinolepidotus longidorsalis* (sp. nov.) resembles *Sinolepidotus chekiangensis* in the body form, long dorsal fin, small mouth, configuration of cranial roof and opercular apparatus, deep coronoid process of the mandible, and deep scales of the antero-dorsal region, However, it is distinct from the latter in having an acute snout, very long dorsal fin and large number of fin-rays of the fin, enlarged anal scales, and in lack of pectinations of the flank-scales.

The genus *Sinolepidotus* was erected by Wei et al. (1976) to include a single species, *S. chekiangensis*, from the Lower Cretaceous fresh water deposits of Zhejiang, and placed within the Semionotidae on the basis of resemblances with *Lepidotes*, *Asialepidotus* and *Neolepidotes*. According to my observation, *Sinolepidotus* is widely different from the latter three genera in morphological characters, and it closely resembles *Paralepidotus* in many respects, including: body deeply fusiform; dorsal margin of the trunk elevated at the origin of the dorsal fin; dorsal fin rather

long, beginning at the top of the dorsal hump, and with well spaced rays; dorsal ridge scales inconspicuous; parietals large and in contact in the midline; frontals long and narrow; operculum deep and rectangular; preoperculum narrow and arched; mouth gape small; mandibula short, with

weak. However, it differs from *Paralepidotus* in the following characters: supraorbitals two in number (in *Paralepidotus* four, rarely five); caudal fin with 14 principal rays (in *Paralepidotus* 20 principals); coronoid process of mandibula relatively lower; suboperculum with short antero-dorsal process; marginal teeth deep and pointed (in *Paralepidotus* crushing dentition). From the distinctive characters stated above, *Sinolepidotus* is a separate genus, and probably related to *Paralepidotus*. Olsen and McCune (1991) restricted the Semionotidae, including only the genera *Semionotus* and *Lepidotes*, on the basis of two synapomorphies: the presence of a complete dorsal ridge scales row and a large posteriorly directed process on the epiotic. *Paralepidotus* was excluded by them from the Semionotidae. Tintori (1996) reviewed *Paralepidotus*, and again placed it within the Semionotidae. *Sinolepidotus* possesses inconspicuous dorsal ridge scales, but its structure of epiotic is not clear. Therefore its position within the family Semionotidae is questionable.

Sinolepidotus longidorsalis occurs in the Yangchòng Formation (continental deposits) of the Southern Jiangsu. Besides fishes, some invertebrates have been found in the same formation. These include remains of Bivavia, *Nakamuranaia elongata*, *Nakamuranaia* cf. *N. subrotunda*, *Nakamuranaia* cf. *N. chingshanensis*, and Conchostraca, *Orthestheria* sp. Based on the nature of the fauna, the age of Yangchòng Formation is considered as Early Cretaceous.

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